

AMENDMENTS TO THE CLAIMS

Please amend the claims as they currently stand so that they are in accord with the following listing of the claims:

Claim 1 (currently amended): A system for determining an intracorporal position of a working catheter, comprising:

a single lead working catheter for carrying out desired working operations, said working catheter comprising a catheter ~~[[that]]~~ adapted to be~~[[is]]~~ fixedly implantable in a body and that carries electrodes ~~[[of]]~~adapted to be in electrical communication with a cardiac pacemaker or a defibrillator; ~~[[and]]~~

an intracorporal reference catheter for producing a co-ordinate system, and

wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and wherein the working catheter reference units are asymmetrically arranged on the single lead of the working catheter so that an orientation of the working catheter can be detected in the co-ordinate system of the reference catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units~~[[,]]~~; and

a ~~[[processing]]~~control unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units.

Claim 2 (previously presented): The system as set forth in claim 1

wherein the working catheter is a mapping catheter for generating a three-dimensional image of the heart cavity surrounding the mapping catheter.

Claim 3 (previously presented): The system of claim 1,

wherein the working catheter is an ablation catheter for producing a lesion of the endocardium surrounding the ablation catheter.

Claim 4 (cancelled)

Claim 5 (cancelled):

Claim 6 (previously presented): The system of claim 1,
wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

Claim 7 (currently amended): The system of claim 1,
wherein at least one reference unit is arranged at a tip of the working catheter, and
at least one further reference unit is arranged in [[the rest of the]]a distal region of the
working catheter.

Claim 8 (currently amended): The system of claim 1,
wherein [[the]]a distal region of the working catheter is of a previously established
specific shape on which distal region at least three reference units are distributed so that the
specific, previously established shape of the distal region can be incorporated by the
[[processing]]control unit when ascertaining the position of the working catheter by calculating
the position of the working catheter.

Claim 9 (previously presented): The system of claim 1,
wherein either the reference catheter is also a working catheter or the working catheter is
also a reference catheter, such that reference units for transmitting waves and reference units for
receiving waves are provided on each catheter.

Claim 10 (currently amended): The system of claim 1,
wherein the [[processing]] control unit is adapted by means of the reference units to
implement topological and/or electrical measurement of the endocardium in which the respective
working catheter is disposed.

Claim 11 (currently amended): The system of claim 1,

wherein the reference catheter reference units irradiate electromagnetic radiation and/or ultrasonic waves to ascertain the position of the working catheter in the co-ordinate system afforded by the reference catheter[[, wherein the reference catheter reference units build up at least one electromagnetic field]].

Claim 12 (previously presented): The system of claim 1,

wherein the reference catheter is placed in the coronary sinus for use of the system in the heart.

Claim 13 (currently amended): The system of claim 1, wherein

the plurality of working catheter reference units comprises at least three working catheter reference units; and

the [[processing]]control unit calculates a three-dimensional spline that represents the position of the working catheter in the reference catheter co-ordinate system from the data from the at least three working catheter reference units.

Claim 14 (cancelled):

Claim 15 (currently amended): The system of claim 1,

wherein at least one of the reference units is a sensor for detecting the presence and/or the strength of [[the]]a wall contact of the working catheter with [[the]]an endocardium surrounding the catheter.

Claim 16 (currently amended): The system of claim 1,

wherein the system has between two and five working catheters, wherein each catheter has between three and twenty-four reference units which are electrodes to detect [[the]]a corresponding number of potential differences in the case of working catheters inserted into a cavity in a heart.

Claim 17 (previously presented): The system of claim 16,

wherein the electrodes are ring electrodes.

Claim 18 (currently amended): The system of claim 1,

wherein the reference units are electrodes that are actuatable simultaneously by the [[processing]]control unit.

Claim 19 (currently amended): The system of claim 1,

wherein the working catheter has at least two electrodes mounted on the working catheter at different locations from the reference units, and wherein, relative to the electrodes, the reference units are in a previously established specific spatial position that can be taken into account by the [[processing]]control unit when ascertaining the position of the working catheter in the co-ordinate system defined by the reference catheter.

Claim 20 (currently amended): The system of claim 1, further comprising

control members at [[the]]a proximal end of the working catheter for producing a rotation of the working catheter and/or a flexing of [[the]]a distal end of the working catheter.

Claim 21 (currently amended): The system of claim 20, further comprising:

a first signal line, extending from [[the]]a distal tip to the proximal end of the working catheter and connecting to the working catheter reference units[,]; and

a second signal line, extending from [[the]]a distal tip to [[the]]a proximal end of the reference catheter and connecting to the reference catheter reference units,

wherein the [[processing]]control unit is connected by way of the first signal line to the working catheter reference units and by way of the second signal line to the reference catheter reference units, and

wherein the [[processing]]control unit is connected to the control members and actuates the control members in response to the signals from the reference catheter reference units in order to produce a rotation or a flexing of the working catheter.

Claim 22 (currently amended): The system of claim 1 wherein said working catheter comprises:

[[A working catheter having a distal tip and a proximal end for use in a system as set forth in claim 1

characterised by]]

said reference units of said working catheter for sending signals which are characteristic for the position of the working catheter[[,]]; and

a signal line which extends from [[the]]a distal tip to [[the]]a proximal end of the working catheter and which is connected to the reference units of said working catheter.

Claim 23 (currently amended): The system of claim 1 wherein said reference catheter

comprises:[[A reference catheter having a distal tip and a proximal end for use in a system as set forth in claim 1

characterised by]]

said reference units of said reference catheter for receiving position signals[[,]]; and

a signal line which extends from [[the]]a distal tip to [[the]]a proximal end of the reference catheter and which is connected to the reference units of said reference catheter.

Claim 24 (previously presented): The system of claim 3,

wherein the ablation catheter produces a linear lesion.

Claim 25 (cancelled)

Claim 26 (cancelled)

Claim 27 (cancelled)

Claim 28 (cancelled):

Claim 29 (cancelled):

Claim 30 (currently amended): The system of claim [[5]]1,

wherein the working catheter reference units are arranged to form the corners of a triangle.

Claim 31 (cancelled)

Claim 32 (cancelled):

Claim 33 (cancelled):

Claim 34 (cancelled):

Claim 35 (cancelled)

Claim 36 (cancelled):

Claim 37 (cancelled):

Claim 38 (currently amended): The system of claim 6,
wherein at least one reference unit is arranged at a tip of the working catheter, and
at least one further reference unit is arranged in [[the rest of the]]a distal region of the
working catheter.

Claim 39 (cancelled):

Claim 40 (cancelled)

Claim 41 (cancelled):

Claim 42 (cancelled):

Claim 43 (previously presented): The system of claim 7,
wherein the at least one further reference unit is a plurality of said reference units.

Claim 44 (currently amended): The system of claim 43,
wherein there are at least twelve said further reference units arranged in [[the rest of]] the
distal region of the catheter.

Claim 45 (currently amended): The system of claim 43,
wherein there are fewer than twenty-four further reference units arranged in [[the rest of]]
the distal region of the catheter.

Claim 46 (cancelled):

Claim 47 (previously presented): The system of claim 9,
wherein either the reference catheter is also a working catheter or the working catheter is
also a reference catheter, such that reference units for simultaneously transmitting waves and
receiving waves are provided on each catheter.

Claim 48 (previously presented): The system of claim 9,
wherein the waves transmitted or received by the reference units are electromagnetic.

Claim 49 (previously presented): The system of claim 47,
wherein the waves transmitted or received by the reference units are electromagnetic.

Claim 50 (previously presented): The system of claim 9,
wherein the waves transmitted or received by the reference units are ultrasonic.

Claim 51 (previously presented): The system of claim 47,
wherein the waves transmitted or received by the reference units are ultrasonic.

Claim 52 (currently amended): A system for determining an intracorporal position of a working catheter, comprising:

a single lead working catheter for carrying out desired working operations; [[and]]
an intracorporal reference catheter for producing a co-ordinate system,
wherein the working catheter has a plurality of asymmetrically arranged working catheter reference units for sending signals which are characteristic for the position of the working catheter, at least one said reference unit being arranged at a tip of the working catheter and at least one further said reference unit being arranged in [[the]]a rest of the distal region of the working catheter, and

wherein the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units[[,]]; and

a [[processing]]control unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units.

Claim 53 (previously presented): The system of claim 52,

wherein the at least one further reference unit is a plurality of said reference units.

Claim 54 (previously presented): The system of claim 53,

wherein there are at least twelve said further reference units arranged in the rest of the distal region of the catheter.

Claim 55 (previously presented): The system of claim 53,

wherein there are fewer than twenty-four further reference units arranged in the rest of the distal region of the catheter.

Claim 56 (currently amended): A system for determining an intracorporal position of a working catheter, comprising:

a single lead working catheter for carrying out desired working operations; [[and]]
an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of asymmetrically arranged working catheter reference units for sending signals which are characteristic for the position of the working catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units[[,]]; and

a [[processing]]control unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units,

wherein a distal region of the working catheter is of a previously established specific shape on which distal region at least three reference units are distributed so that the specific, previously established shape of the distal region can be incorporated by the [[processing]]control unit when ascertaining the position of the working catheter by calculating the position of the working catheter.

Claim 57 (cancelled):

Claim 58 (currently amended): A system for determining an intracorporal position of a working catheter, comprising:

a single lead working catheter for carrying out desired working operations; [[and]]

an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of asymmetrically arranged working catheter reference units for sending signals which are characteristic for the position of the working catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units[[,]]; and

a [[processing]]control unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units, and

wherein at least one of the reference units is a sensor for detecting the presence and/or the strength of the wall contact of the working catheter with the endocardium surrounding the catheter.

Claim 59 (currently amended): A system for determining an intracorporal position of a working catheter, comprising:

a single lead working catheter for carrying out desired working operations; [[and]]
an intracorporal reference catheter for producing a co-ordinate system,
wherein the working catheter has a plurality of asymmetrically arranged working catheter reference units for sending signals which are characteristic for the position of the working catheter, and
the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units[[,]]; and
a [[processing]]control unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units,
wherein the reference units are electrodes that are actuatable simultaneously by the [[processing]]control unit.

Claim 60 (currently amended): A system for determining an intracorporal position of a working catheter, comprising:

a single lead working catheter for carrying out desired working operations; [[and]]
an intracorporal reference catheter for producing a co-ordinate system,
wherein the working catheter has a plurality of asymmetrically arranged working catheter reference units for sending signals which are characteristic for the position of the working catheter, and
the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units[[,]]; and
a [[processing]]control unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units,
wherein the working catheter has at least two electrodes mounted on the working catheter at different locations from the reference units, and wherein, relative to the electrodes, the reference units are in a previously established specific spatial position that can be taken into

account by the [[processing]]control unit when ascertaining the position of the working catheter in the co-ordinate system defined by the reference catheter.